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 NEWS  4  FEB 02  GENBANK enhanced with SET PLURALS and SET SPELLING
 NEWS  5  FEB 06  Patent sequence location (PSL) data added to USGENE
 NEWS  6  FEB 10  COMPENDEX reloaded and enhanced
 NEWS  7  FEB 11  WTEXTILES reloaded and enhanced
 NEWS  8  FEB 19  New patent-examiner citations in 300,000 CA/CAplus
                  patent records provide insights into related prior
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 NEWS  9  FEB 19  Increase the precision of your patent queries -- use
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 NEWS 10  FEB 23  Several formats for image display and print options
                  discontinued in USPATFULL and USPAT2
 NEWS 11  FEB 23  MEDLINE now offers more precise author group fields
                  and 2009 MeSH terms
 NEWS 12  FEB 23  TOXCENTER updates mirror those of MEDLINE - more
                  precise author group fields and 2009 MeSH terms
 NEWS 13  FEB 23  Three million new patent records blast AEROSPACE into
                  STN patent clusters
 NEWS 14  FEB 25  USGENE enhanced with patent family and legal status
                  display data from INPADOCDB
 NEWS 15  MAR 06  INPADOCDB and INPAFAMDB enhanced with new display
                  formats
 NEWS 16  MAR 11  EPFULL backfile enhanced with additional full-text
                  applications and grants
 NEWS 17  MAR 11  ESBIOBASE reloaded and enhanced
 NEWS 18  MAR 20  CAS databases on STN enhanced with new super role
                  for nanomaterial substances
 NEWS 19  MAR 23  CA/CAplus enhanced with more than 250,000 patent
                  equivalents from China
 NEWS 20  MAR 30  IMSPATENTS reloaded and enhanced
 NEWS 21  APR 03  CAS coverage of exemplified prophetic substances
                  enhanced
 NEWS 22  APR 07  STN is raising the limits on saved answers
 NEWS 23  APR 24  CA/CAplus now has more comprehensive patent assignee
                  information
 NEWS 24  APR 26  USPATFULL and USPAT2 enhanced with patent
                  assignment/reassignment information
 NEWS 25  APR 28  CAS patent authority coverage expanded
 NEWS 26  APR 28  ENCOMPLIT/ENCOMPLIT2 search fields enhanced
 NEWS 27  APR 28  Limits doubled for structure searching in CAS
                  REGISTRY

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             AND CURRENT DISCOVER FILE IS DATED 23 JUNE 2008.

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REVISED CLASS FIELDS (/NCL) LAST RELOADED:  Feb 2009
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=> s (hermetic? or leak?) and (mems or moems or micrometric) and py<=2004
         14143 HERMETIC?
        125618 LEAK?
         12648 MEMS
           353 MOEMS
          1317 MICROMETRIC
             9 MICROMETRICS
          1326 MICROMETRIC
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                  (MICROMETRIC OR MICROMETRICS)
      25140108 PY<=2004
L1         196 (HERMETIC? OR LEAK?) AND (MEMS OR MOEMS OR MICROMETRIC) AND PY<=
                2004

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        152386 VISUAL?
L2          30 L1 AND (OPTIC? OR VISUAL?)

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L2 ANSWER 1 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN

ACCESSION NUMBER: 2005:941300 CAPLUS
DOCUMENT NUMBER: 143:469098
TITLE: Monolithic suspended optical waveguides for InP MEMS
AUTHOR(S): Kelly, Daniel P.; Pruessner, Marcel W.; Amarnath, Kuldeep; Datta, Madhumita; Kanakaraju, S.; Calhoun, Lynn C.; Ghodssi, Reza
CORPORATE SOURCE: Department of Electrical and Computer Engineering, Institute for Systems Research, University of Maryland, College Park, MD, 20740, USA
SOURCE: IEEE Photonics Technology Letters (2004), 16(5), 1298-1300
CODEN: IPTLEL; ISSN: 1041-1135
PUBLISHER: Institute of Electrical and Electronics Engineers
DOCUMENT TYPE: Journal
LANGUAGE: English

AB We present a novel waveguide design for InP microelecromech. systems. The substrate is removed from underneath the waveguide by sacrificial etching, and the suspended waveguide is supported by lateral tethers. This allows segments of the waveguide to be moved and prevents substrate leakage loss in the fixed segments of the waveguides. A single-mask fabrication process is developed that can be extended to more complex devices employing electrostatic actuation. Fabricated suspended waveguides exhibit a loss of 2.2 dB/cm and tether pairs exhibit 0.25-dB addnl. loss.

REFERENCE COUNT: 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 2 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN

ACCESSION NUMBER: 2005:303321 CAPLUS
DOCUMENT NUMBER: 142:363946
TITLE: Methods for depositing, releasing and packaging micro-electromechanical devices on wafer substrates
INVENTOR(S): Patel, Satayadev R.; Huibers, Andrew G.; Chiang, Steve; Duboc, Robert M.; Grobelny, Thomas J.; Chen, Hung Nan; Dehlinger, Dietrich; Richards, Peter W.; Shi, Hongqin; Sun, Anthony
PATENT ASSIGNEE(S): Reflectivity, Inc., USA
SOURCE: U.S. Pat. Appl. Publ., 25 pp., Cont.-in-part of U.S. Ser. No. 5,308.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 20
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20050074919	A1	20050407	US 2002-167361	20020611
US 7307775	B2	20071211		
US 20030054588	A1	20030320	US 2001-5308	20011203
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US 6969635	B2	20051129		
AU 2002250322	A1	20021003	AU 2002-250322	20020315
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WO 2003105198	A1	20031218	WO 2003-US18741	20030611
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AU 2003263744	A1	20031222	AU 2003-263744	20030611
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CN 1659684	A	20050824	CN 2003-813553	20030611
JP 2005534048	T	20051110	JP 2004-512176	20030611
EP 1766663	A1	20070328	EP 2003-817376	20030611
R: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LI, LU, MC, NL, PT, RO, SE, SI, SK, TR				
WO 2004093083	A2	20041028	WO 2004-US9221	20040324
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WO 2004093083	A3	20050609		
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RW: BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
EP 1611581	A2	20060104	EP 2004-758968	20040324
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CN 1784748	A	20060607	CN 2004-80012015	20040324

L2 ANSWER 2 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN (Continued)

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
US 20050042792	A1	20050224	US 2004-930342		20040830
US 6995034	B2	20060207			
US 20050048688	A1	20050303	US 2004-930450		20040830
US 20050139940	A1	20050630	US 2005-70036		20050301
US 20050170540	A1	20050804	US 2005-93550		20050329
US 7198982	B2	20070403			
US 20050170614	A1	20050804	US 2005-93927		20050329
US 7449358	B2	20081111			
US 20050170557	A1	20050804	US 2005-93942		20050329
US 20050170547	A1	20050804	US 2005-93943		20050329
US 6995040	B2	20060207			
US 20050173711	A1	20050811	US 2005-94087		20050329
US 20050181532	A1	20050818	US 2005-102183		20050407
US 20050179982	A1	20050818	US 2005-102187		20050407
US 20050191789	A1	20050901	US 2005-102291		20050407
US 20050191790	A1	20050901	US 2005-102295		20050407
US 20050214976	A1	20050929	US 2005-102108		20050407
US 20050260792	A1	20051124	US 2005-102204		20050407
US 7286278	B2	20071023			
US 20050260793	A1	20051124	US 2005-102214		20050407
US 20070001247	A1	20070104	US 2005-101939		20050407
US 20080096313	A1	20080424	US 2007-954076		20071211
PRIORITY APPLN. INFO.:			US 2000-254043P	P	20001207
			US 2001-276222P	P	20010315
			US 2001-5308	A2	20011203
			WO 2002-US7761	W	20020315
			US 2002-167361	A	20020611
			US 2003-407061	A	20030402
			WO 2003-US18741	W	20030611
			WO 2004-US9221	W	20040324

AB A projection system, a spatial light modulator, and a method for forming a MEMS device is disclosed. The spatial light modulator can have two substrates bonded together with one of the substrates comprising a micromirror array. The two substrates can be bonded at the wafer level after depositing a getter material and/or solid or liquid lubricant on one or both of the wafers. The wafers can be bonded together hermetically if desired, and the pressure between the two substrates can be below atmospheric

REFERENCE COUNT: 86 THERE ARE 86 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 3 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN

ACCESSION NUMBER: 2005:271330 CAPLUS
DOCUMENT NUMBER: 142:344864
TITLE: Method of sealing a hermetic lid to a semiconductor die at an angle
INVENTOR(S): Leung, Omar S.
PATENT ASSIGNEE(S): Silicon Light Machines Corporation, USA
SOURCE: U.S., 27 pp., Cont.-in-part of U.S. Ser. No. 866,266.
CODEN: USXXAM
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
US 6872984	B1	20050329	US 2002-179664		20020624
US 6303986	B1	20011016	US 1998-124710		19980729
<--					
US 20010022382	A1	20010920	US 2001-866266		20010524
<--					
US 6764875	B2	20040720			
PRIORITY APPLN. INFO.:			US 1998-124710	A3	19980729
			US 2000-605198	B2	20000627
			US 2001-866266	A2	20010524

AB The current invention provides a optical MEM device and system with an angled lid for hermetically sealing an active MEMS structure. The lid is sealed through an asym. seal formed with sealing rings having an asym. distribution of solder wetting surfaces which tilts the lid, when the lid and a substrate are soldered together. The asym. distribution wetting surfaces can be provided by forming one or more edge features, by patterning portions of the sealing rings or both. Preferably, the lid is transparent to one or more wavelengths of light at 300-3000 Å and hermetically seals a grating light valve structure having a plurality of movable ribbon for modulating light through the lid.

REFERENCE COUNT: 969 THERE ARE 969 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 4 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2005:87926 CAPLUS
DOCUMENT NUMBER: 143:335680
TITLE: Conducting antireflection coatings with low polarization dependent loss for telecommunication applications
AUTHOR(S): Dobrowolski, J. A.; Ford, Joseph E.; Sullivan, Brian T.; Lu, Liping; Osborne, Norman R.
CORPORATE SOURCE: Institute for Microstructural Sciences, National Research Council of Canada, Ottawa, ON, K1A 0R6, Can.
SOURCE: Optics Express (2004), 12(25), 6258-6269
CODEN: OPEXFF; ISSN: 1094-4087
URL:
http://www.opticsexpress.org/view_file.cfm?doc=%2

4%29%2C%3B%2BJ0%20%20%0A&id=%25%28%2C%2B%27K%5C%5C%20%
0A
PUBLISHER: Optical Society of America
DOCUMENT TYPE: Journal; (online computer file)
LANGUAGE: English

AB Conducting optical coatings for the visible light range are commonly made of In Sn Oxide (ITO), but ITO is unsuitable for near-IR telecommunications wavelengths because it can become absorptive after extended illumination. The authors show an alternative approach which uses conventional coating materials to create either nonconducting or conducting antireflection (AR) coatings that are effective over a fairly broad spectral region (λlong/λshort ≈ 1.40) and also usable for a wide range of angles of incidence (0-38°, or 0-55°) in the telecom wavelength range. Not only is the transmittance of windows treated with such coatings quite high, but they can be made to have extreme polarization independence (low polarization dependent loss values). A number of such coating designs are presented.
A
prototype of one of the conducting AR coating designs was fabricated and the measurements are in reasonable agreement with the calculated
performance.
Such AR coatings should be of interest for telecommunication applications and especially for antistatic hermetic packaging of MEMS devices such as optical switches.

REFERENCE COUNT: 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR
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RECORD. ALL CITATIONS AVAILABLE IN THE RE
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L2 ANSWER 5 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2004:436641 CAPLUS
DOCUMENT NUMBER: 141:132343
TITLE: Localized, in-situ vacuum measurements for MEMS packaging
AUTHOR(S): Moelders, Nicholas; Daly, James T.; Greenwald, Anton C.; Johnson, Edward A.; McNeal, Mark P.; Patel, Ramesh; Pralle, Martin U.; Puscasu, Irina
CORPORATE SOURCE: Ion Optics, Inc., Waltham, MA, USA
SOURCE: Materials Research Society Symposium Proceedings (2004), Volume Date 2003, 782(Micro- and Nanosystems), 211-215
CODEN: MRSPDH; ISSN: 0272-9172
PUBLISHER: Materials Research Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB MEMS devices have unique packaging considerations compared to conventional semiconductor devices. They tend to have relatively large die size and many architectures cannot tolerate elevated temps. Often these devices require a vacuum environment for efficient operation.
While
advances were made in hermetic packaging of MEMS devices, vacuum packaging remains elusive. One significant problem in developing vacuum sealing was the inability to determine, readily and nondestructively, the vacuum level inside the package. The authors have previously described the development of a Si MEMS-based chip design, SensorChip, with integrated photonic crystal and reflective optics, which uses narrow-band optical emission and absorption for selective identification of gas and chemical species.
Because
the power consumption required to maintain a specific temperature is
directly
related to the vacuum level, these devices effectively serve as microscopic Pirani gauges - local vacuum sensors in the moderate vacuum range (0.01 to 1.0 torr) of interest to MEMS devices. Using the membrane itself as a vacuum gauge during sealing proved to be an invaluable tool in developing a robust vacuum seal in a leadless chip carrier package. It has enabled the authors to optimize choice of
design,
materials and processing.

REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS
RECORD. ALL CITATIONS AVAILABLE IN THE RE
FORMAT

L2 ANSWER 6 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2004:244700 CAPLUS
TITLE: Light activated switch and the production method [Machine Translation].
INVENTOR(S): Maeda, Hidetaka; Kato, Kenji
PATENT ASSIGNEE(S): Seiko Instruments, Inc., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 11 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2004094089	A	20040325	JP 2002-257596	20020903

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PRIORITY APPLN. INFO.: JP 2002-257596 20020903

AB [Machine Translation of Descriptors]. Switching operation is made secure and high speed in the light activated switch which is produced minutely making use of MEMS technology, electric power consumption small the paragraph and leakage flux are made small with operational efficiency as satisfactory. In lower part baseplate 11, it forms simultaneously the 1st V groove concave section 23a of 12 for optical fiber fixing and laminated spring positioning expedient 23, with etching. And, movable optical fiber inside 1st V groove 12, positioning laminated spring 13 in concave section 23a, it locks 16 and fixed optical fiber 26 respectively. Positioning time being categorized 15 to concave section 21a of concave section 11a
of
lower part baseplate 11 and upper baseplate 21, the alignment doing both baseplates 11,21, it locks mutually. One fixed optical fiber 26 is locked already inside 2nd V groove 22 of upper baseplate 21. Then, in the surface of upper baseplate 21 making the portion of electromagnet 18 the electromagnet positioning concave section fit 25 which, is formed by etching positioning, it locks.

L2 ANSWER 7 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2004:210909 CAPLUS
DOCUMENT NUMBER: 141:339961
TITLE: Total dose degradation of MEMS optical mirrors
AUTHOR(S): Miyahira, T. F.; Becker, H. N.; McClure, S. S.; Edmonds, L. D.; Johnston, A. H.; Hishinuma, Y.
CORPORATE SOURCE: Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA
SOURCE: IEEE Transactions on Nuclear Science (2003), 50(6, Pt. 1), 1860-1866
CODEN: IETNAE; ISSN: 0018-9499
PUBLISHER: Institute of Electrical and Electronics Engineers
DOCUMENT TYPE: Journal
LANGUAGE: English

AB This paper discusses the effect of ionizing radiation on two types of deformable MEMS mirrors. Little effect was observed in the technol. that was based on electrostatic deflection, consistent with the structural design that does not contain insulators between the two sections. Significant changes in the operating characteristics were
observed
for the 2nd type of mirror, which uses piezoelec. material for actuation. The mirrors required higher total dose levels before they were affected compared with MEMS accelerometers, which can be explained by the larger interelement spacing used in the mirror arrays.

REFERENCE COUNT: 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR
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RECORD. ALL CITATIONS AVAILABLE IN THE RE
FORMAT

L2 ANSWER 8 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2004:65938 CAPLUS
DOCUMENT NUMBER: 141:15019
TITLE: Sealing of adhesive bonded devices on wafer level
AUTHOR(S): Oberhammer, J.; Niklaus, F.; Stemme, G.
CORPORATE SOURCE: Microsystem Technology, Sensors and Systems, Department of Signals, Royal Institute of Technology (KTH), Stockholm, SE-10044, Swed.
SOURCE: Sensors and Actuators, A: Physical (2004), A110(1-3), 407-412
CODEN: SAAPEB; ISSN: 0924-4247
PUBLISHER: Elsevier Science B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB In this paper, we present a low temperature wafer-level encapsulation technique to hermetically seal adhesive bonded microsystem structures by cladding the adhesive with an addnl. diffusion barrier. Two wafers containing cavities for MEMS devices were bonded together using benzocyclobutene (BCB). The devices were sealed by a combined dicing and self-aligning etching technique and by finally coating the structures with evaporated gold or PECVD silicon nitride. The sealing layer was inspected visually by SEM and helium leak tests were carried out. Devices sealed with silicon nitride and with known damage of the sealing layer showed a helium leak rate of .apprx.7-14 times higher than the background level. Devices of the same size without damage in the sealing layer had a leak rate of only 1.5 times higher than the background level. Expts. with evaporated gold as cladding layer revealed leaking cracks in the film even up to a gold thickness of 5 μm. The sealing technique with silicon nitride shows a significant improvement of the hermeticity properties of adhesive bonded cavities, making this bonding technique suitable for applications with certain demands on gas-tightness.

REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 9 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2004:54893 CAPLUS
DOCUMENT NUMBER: 140:348345
TITLE: Rare-earth-enabled universal solders for microelectromechanical systems and optical packaging
AUTHOR(S): Jin, Sungho
CORPORATE SOURCE: University of California at San Diego, La Jolla, CA, 92093-0411, USA
SOURCE: Journal of Electronic Materials (2003), 32(12), 1366-1370
CODEN: JECMA5; ISSN: 0361-5235
PUBLISHER: Minerals, Metals & Materials Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB In packaging of microelectromech. systems (MEMS), optical, and electronic devices, there is a need to directly bond a wide variety of inorg. materials, such as oxides, nitrides, and semiconductors. Such applications involve hermetic-sealing components, three-dimensional MEMS assembly components as well as active semiconductor or optical components, dielec. layers, diffusion barriers, waveguides, and heat sinks. These materials are known to be difficult to wet and bond with low melting-point solders. New Sn-Ag- or Au-Sn-based universal solders doped with a small amount of rare-earth (RE) elements were developed, which now allow direct and powerful bonding onto the surfaces of various MEMS, optical, or electronic device materials. The microstructure, interface properties, and mech. behavior of the bonds as well as the potential packaging applications of these new solder materials for MEMS and optical fiber devices are described. Various packaging-related structural, thermal, or elec. issues in MEMS are also discussed.

REFERENCE COUNT: 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 10 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2003:991807 CAPLUS
DOCUMENT NUMBER: 140:51741
TITLE: Methods for depositing, releasing, and packaging microelectromechanical devices on wafer substrates
INVENTOR(S): Patel, Satyadev; Huibers, Andrew; Richards, Peter; Shi, Hongqin; Chiang, Steve; Duboc, Robert, Jr.; Grobelny, Thomas; Dehlinger, Dietrich; Sun, Anthony; Chen, Hung Nan
PATENT ASSIGNEE(S): Reflectivity, Inc., USA
SOURCE: PCT Int. Appl., 44 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 20
PATENT INFORMATION:

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     WO 2003105198        A1     20031218    WO 2003-US18741          20030611
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            LS, LT, LU, LV, MA, MD, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT,
            RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG,
            US, UZ, VC, VN, YU, ZA, ZM, ZW
     US 20050074919       A1     20050407    US 2002-167361           20020611
     US 7307775           B2     20071211
     AU 2003263744        A1     20031222    AU 2003-263744           20030611
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     CN 1659684           A      20050824    CN 2003-813553           20030611
     JP 2005534048        T      20051110    JP 2004-512176           20030611
     EP 1766663           A1     20070328    EP 2003-817376           20030611
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            IT, LI, LU, MC, NL, PT, RO, SE, SI, SK, TR
     WO 2004093083        A2     20041028    WO 2004-US9221           20040324
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     WO 2004093083        A3     20050609
         W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH,
            CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD,
            GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
            LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI,
            NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY,
            TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
        RW: BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ,
            BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE,
            ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,
            SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN,
            TD, TG
     EP 1611581           A2     20060104    EP 2004-758968           20040324
         R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
            IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK
     CN 1784748           A      20060607    CN 2004-80012015         20040324
PRIORITY APPLN. INFO.:                       US 2002-167361       A   20020611

                                             US 2000-254043P      P   20001207

                                             US 2001-276222P      P   20010315
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L2 ANSWER 10 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN (Continued)

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                                             US 2001-5308         A2  20011203

                                             US 2003-407061       A   20030402

                                             WO 2003-US18741      W   20030611

                                             WO 2004-US9221       W   20040324
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AB The present invention provides methods for making microelectromech. devices on a wafer. The subject matter of the present invention is related to manufacturing multiple MEMS devices on a wafer, releasing the MEMS structures by removing a sacrificial material, bonding the wafer to another wafer, singulating the wafer assembly, and packaging each wafer assembly portion with one or more MEMS devices thereon, without damaging the MEMS microstructures thereon. A wide variety of microelectromech. devices (MEMS) devices can be made including accelerometers, DC relay and RF switches, optical cross connects and optical switches, microlenses, reflectors and beam splitters, filters, oscillators and antenna system components, variable capacitors and inductors, switched banks of filters, resonant comb-drives and resonant beams, and micromirror arrays for direct view and projection displays. A projection system, a spatial light modulator, and a method for forming a MEMS device are disclosed. The spatial light modulator can have 2 substrates bonded together with 1 of the substrates comprising a micromirror array. The 2 substrates can be bonded at the wafer level after depositing a getter material and/or solid or liquid lubricant on 1 or both of the wafers. The wafers can be bonded together hermetically if desired, and the pressure between the 2 substrates can be below atmospheric

REFERENCE COUNT: 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 11 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2003:939755 CAPLUS
DOCUMENT NUMBER: 141:95809
TITLE: Beginning-to-end wafer bonding for advanced optical systems
AUTHOR(S): Farrens, Shari N.; Lindner, Paul; Dwyer, Steven; Wimplinger, Markus
CORPORATE SOURCE: EV Group Inc., Phoenix, AZ, 85034, USA
SOURCE: Proceedings of SPIE-The International Society for Optical Engineering (2003), 5177(Gradient Index, Miniature, and Diffractive Optical Systems III), 31-36
CODEN: PSISDG; ISSN: 0277-786X
PUBLISHER: SPIE-The International Society for Optical Engineering
DOCUMENT TYPE: Journal; General Review
LANGUAGE: English

AB A review. The old adage "work smarter, not harder" is certainly applicable in today's competitive marketplace for optical MEMS. To survive the current economic conditions, high volume manufacturers must get optimum performance and yield from each design and manufactured component. Wafer bonding, and its numerous variants, is entering mainstream production environments by providing solns. throughout the production flow. For example, SOI (Si on insulator) and other laminated materials such as GaAs/Si are used as cost effective alternatives to mol. epitaxy methods for Bragg mirrors, r.f. resonators, and hybrid device fabrication. Temporary wafer bonding is used extensively to allow fragile compound semiconductors to be attached to rigid support wafers. This allows for front side and backside processing with a reduction in wafer breakage and increases in thickness uniformity results after backgrind operations. Permanent wafer bonding is used to attach compound semiconductors to each other or Si to completely integrate optical components and logic or MEMS components. Permanent hermetic sealing is used for waveguide formation and, when combined with vacuum sealing, higher performance is achieved for r.f. resonators. Finally, many of the low temperature solders and eutectic alloys are finding application in low temperature wafer-to-wafer level packaging of optical devices to ceramic packages. Through clever application of these bonding methods, throughput increases and reduction in fabrication complexity givs a clear edge in the market place. This presentation will provide guidelines and process overviews needed to adopt wafer-to-wafer bonding technologies into the high volume-manufacturing environment.

REFERENCE COUNT: 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 12 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2003:787533 CAPLUS
DOCUMENT NUMBER: 140:189601
TITLE: Drift-free, 1000G mechanical shock tolerant single-crystal silicon two-axis MEMS tilting mirrors in a 1000x1000-port optical crossconnect
AUTHOR(S): Gasparyan, A.; Shea, H.; Arney, S.; Aksyuk, V.; Simon, M. E.; Pardo, F.; Chan, H. B.; Kim, J.; Gates, J.; Kraus, J. S.; Goyal, S.; Carr, D.; Kleiman, R.
CORPORATE SOURCE: Bell Laboratories, Lucent Technologies, Murray Hill, NJ, 07974, USA
SOURCE: Trends in Optics and Photonics (2003), 86(Optical Fiber Communications Conference, 2003), PD36/1-PD36/3
CODEN: TOPRBS
PUBLISHER: Optical Society of America
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The authors report drift-free two-axis tilting MEMS mirrors fabricated from single crystal Si. These micromirrors survive 1000G mech. shocks and exhibit angular stability better than 4 millidegrees under simulated office vibrations. Two hermetically sealed mirror arrays were used to build a low-loss nonblocking 1000+1000-port optical cross-connect switch.

REFERENCE COUNT: 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 13 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2003:741399 CAPLUS
DOCUMENT NUMBER: 140:311594
TITLE: Packaging of optical MEMS devices
AUTHOR(S): Low, Yee L.; Scotti, Ronald E.; Ramsey, David A.; Bolle, Cristian A.; O'Neill, Steven P.; Nguyen, Khanh C.
CORPORATE SOURCE: Lucent Technologies Bell Labs, Murray Hill, NJ, 07974, USA
SOURCE: Journal of Electronic Packaging (2003), 125(3), 325-328
CODEN: JEPAE4; ISSN: 1043-7398
PUBLISHER: American Society of Mechanical Engineers
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Recently, optical MEMS devices have gained considerable attention in the telecommunications industry-particularly in the optical networking and switching arenas. Since optical MEMS are micro-systems which rely on high precision optics, electronics and mechanics working in close concert, these emerging devices pose some unique packaging challenges yet to be addressed by the general packaging industry. Optical MEMS packages often are required to provide both optical and elec. access, hermeticity, mech. strength, dimensional stability, and long-term reliability. Hermetic optical access necessitates the use of metalized and anti-reflection coated windows, and ever-increasing elec. I/O count has prompted the use of higher d. substrate/package technologies. Taking these requirements into consideration, we explore three ceramic packaging technologies, namely high-temperature co-fired ceramic (HTCC), low-temperature co-fired ceramic (LTCC), and thin-film ceramic technologies. In this paper, we describe some optical MEMS packages designed using these three technologies and discuss their substrate designs, package materials, ease of integration and assembly.

REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 14 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2003:603909 CAPLUS
DOCUMENT NUMBER: 139:126140
TITLE: Packaging micromechanical devices
INVENTOR(S): Low, Yee Leng; Ramsey, David Andrew
PATENT ASSIGNEE(S): Lucent Technologies Inc., USA
SOURCE: U.S., 6 pp.
CODEN: USXXAM
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 6603182	B1	20030805	US 2002-97072	20020312

<--
PRIORITY APPLN. INFO.: US 2002-97072 20020312

AB The specification describes a packaging arrangement for micro-electromech. systems (MEMS). The MEMS devices are mounted on a ceramic platform and are then packaged in a hybrid package. The hybrid package may be hermetically sealed. The hybrid package uses a ceramic insert as the primary MEMS device enclosure. The ceramic insert is mounted on a polymer printed wiring board, which provides both support and elec. interconnection for the ceramic insert. Optical access to the MEMS device is through a transparent window that may be hermetically sealed to the ceramic insert. The use of a ceramic primary enclosure for the MEMS device array substantially eliminates thermomech. instabilities and provides thermomech. and hermetic performance for the elements that require it. The main interconnection and routing function, implemented using standard epoxy resin printed circuit technol., yields high interconnection versatility and performance at low cost.

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 15 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN

ACCESSION NUMBER: 2003:453862 CAPLUS

DOCUMENT NUMBER: 139:172091

TITLE: Tailoring of stress development in MEMS packaging systems

AUTHOR(S): Walwadkar, Satyajit S.; Cho, Junghyun; Farrell, P. W.; Felton, Lawrence E.

CORPORATE SOURCE: Dept. of Mechanical Engineering, State University of New York, Binghamton, NY, 13902-6000, USA

SOURCE: Materials Research Society Symposium Proceedings (2003), Volume Date 2002, 741(Nano- and Microelectromechanical Systems (NEMS and MEMS) and Molecular Machines), 139-144
CODEN: MRSPDH; ISSN: 0272-9172

PUBLISHER: Materials Research Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A better understanding of the origin and evolution of the stresses is a crucial step in improving reliability of packaging systems for microelectromech. systems (MEMS). Given its importance, the authors examine the stresses developed in hermetically packaged MEMS inertial sensors. For this purpose, an optical surface profilometer is employed to assess the stresses by measuring the curvature of dummy Si dies (3.5+3.5 mm2) assembled in different types of packages and die attach adhesives. The authors also explore a temporal evolution of stresses during thermal exposure of the test packages in an effort to emulate actual packaging processes and device operation conditions. The result shows different levels of stresses generated from various adhesives and package types, and also a stress evolution during packaging processes. The mech. stress data also show a good agreement with MEMS performance data obtained from actual accelerometers. Therefore, the stress data will not only be useful in better understanding performance of MEMS packages, but the testing protocol can also provide a diagnostic tool for very small packaging systems.

REFERENCE COUNT: 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 16 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN

ACCESSION NUMBER: 2003:372006 CAPLUS

TITLE: Device for the hermetic encapsulation of a component that must be protected against all stresses

INVENTOR(S): Val, Christian

PATENT ASSIGNEE(S): 3D Plus, Fr.

SOURCE: PCT Int. Appl.
CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: French

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
WO 2003041163	A1	20030515	WO 2002-FR3524		20021015

<--

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
AU 2002350840	A1	20030519	AU 2002-350840		20021015
<--					
EP 1442480	A1	20040804	EP 2002-785549		20021015
<--					

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, SK

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
JP 2005508763	T	20050407	JP 2003-543098		20021015
PRIORITY APPLN. INFO.:			FR 2001-14543	A	20011109
			WO 2002-FR3524	W	20021015

AB The invention relates to a device that is used for the hermetic encapsulation of a component that must protected against all stresses. The aforementioned component (5) is fixed to a substrate (15) having a temperature control element (17) glued (16) to the other face thereof. Said assembly is disposed in a case comprising two parts (11, 12) which are assembled by means of gluing (13), with a passage for optical links (6) and elec. connections (18, 142). Said component is supported by elements (19) which project out from one part (11) of the case. A unit (14) is glued to the other part (12) of the case, said unit comprising three-dimensional interconnections which form the temperature regulation electronics. The aforementioned unit, case (11, 12) and a min. length (L) of the links and connections are encased in a mineral protective layer (4'). In particular, the invention can be used for optoelectronic components and MEMS components.

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 17 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN

ACCESSION NUMBER: 2003:95369 CAPLUS

DOCUMENT NUMBER: 139:93537

TITLE: Conductive interconnections through thick silicon substrates for 3D packaging

AUTHOR(S): Takizawa, Takashi; Yamamoto, Satoshi; Itoi, Kazuhisa; Suemasu, Tatuso

CORPORATE SOURCE: Electron Device Laboratory, Fujikura Ltd., Koto-Ward, Tokyo, 135-8512, Japan

SOURCE: IEEE International Conference on Micro Electro Mechanical Systems, Technical Digest, 15th, Las Vegas, NV, United States, Jan. 20-24, 2002 (2002), 388-391. Institute of Electrical and Electronics Engineers: New York, N. Y.
CODEN: 69DOEU; ISBN: 0-7803-7185-2

DOCUMENT TYPE: Conference

LANGUAGE: English

AB We have developed key technologies to form conductive interconnections through a thick Si substrate, which are potentially applied for 3D device fabrication or packaging of optical MEMS devices. We demonstrate to form metal filled through-holes (THs) in thick Si substrates (t ≈ 500 μm) mainly using photoassisted electrochem. etching (PAECE) and molten metal suctioned method (MMSM). The THs that we exptl. made with these technologies had 15 μm in the diameter and the aspect ratio of 35. The maximum d. was 500 THs/cm2. The dielec. breakdown voltage of the THs was >500 V. In the result of a radioisotope leak test using 85Kr, the leakage rate of THs between the front and the back of the substrate was lower than the detection limit (1 + 10-15 Pa·m3/s.).

REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 18 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN

ACCESSION NUMBER: 2003:67649 CAPLUS

DOCUMENT NUMBER: 139:44474

TITLE: A new approach for opto-electronic/MEMS packaging

AUTHOR(S): Keusseyan, R.; Sosnowski, J.; Doyle, M.; Amey, D.; Horowitz, S.

CORPORATE SOURCE: DuPont i Technologies, Research Triangle Park, NC, 27709, USA

SOURCE: Proceedings - Electronic Components & Technology Conference (2002), 52nd, 259-261
CODEN: PETCES

PUBLISHER: Institute of Electrical and Electronics Engineers

DOCUMENT TYPE: Journal; General Review

LANGUAGE: English

AB A review. Optoelectronic and MEMS packages require unique capabilities over and above traditional hermetic multichip modules. In addition to hermeticity or vacuum atmospheric, optoelectronic systems require direct input/output of optical, r.f. and other sensitive signals through the package using fiber-optic, coaxial and/or other interconnection approaches. Precise optical component alignment and accurate thermal management is critical to achieve component and system performance capabilities. Furthermore, to improve MEMS functionality, performance and service life, a suitable getter and/or dopant is required compatible with the hermetic /vacuum package atmospheric The getter/dopant is usually activated after achieving hermetic or vacuum atmospheric A comprehensive MEMS packaging approach is introduced based on photo-patterned thick film metalization, LTCC, brazing technol. and new feed-through approaches. The new methodol. incorporates most reported MEMS packaging, requirements for proven performance, reliability, low cost and mass production capabilities.

L2 ANSWER 19 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2002:906797 CAPLUS
DOCUMENT NUMBER: 138:10600
TITLE: Radio frequency microelectromechanical systems devices on low-temperature co-fired ceramic substrates
INVENTOR(S): Ozgur, Mehmet; Huff, Michael A.
PATENT ASSIGNEE(S): Corporation for National Research Initiatives, USA
SOURCE: PCT Int. Appl., 141 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002096166 <--	A1	20021128	WO 2002-US15602	20020520
WO 2002096166	A9	20030130		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
AU 2002322008 <--	A1	20021203	AU 2002-322008	20020520
US 20030020173 <--	A1	20030130	US 2002-147907	20020520
US 6815739	B2	20041109		
US 20050167047	A1	20050804	US 2003-663986	20030917
US 7045440	B2	20060516		
US 20040262645 <--	A1	20041230	US 2004-835590	20040430
US 7012327	B2	20060314		
US 20050161753	A1	20050728	US 2005-52302	20050208
PRIORITY APPLN. INFO.:			US 2001-291647P	P 20010518
			US 2002-147907	A3 20020520
			WO 2002-US15602	W 20020520
			US 2004-835590	A3 20040430

AB A phased-array antenna system and other types of radio frequency (RF) devices and systems using microelectromech. switches (MEMS) and low-temperature co-fired ceramic (LTCC) technol. and a method of fabricating such phased-array antenna system and other types of radio frequency (RF) devices are disclosed. Each antenna or other type of device includes ≥2 multilayer ceramic modules and a MEMS device fabricated on 1 of the modules. Once fabrication of the MEMS device is completed, the 2 ceramic modules are bonded together, hermetically sealing the MEMS device, as well as allowing elec. connections between all device layers. The bottom ceramic module has also cavities at the backside for mounting integrated circuits.

L2 ANSWER 19 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN (Continued)
The internal layers are formed using conducting, resistive and high-k dielec. pastes available in std. LTCC fabrication and low-loss dielec. LTCC tape materials.
REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 20 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2002:817919 CAPLUS
DOCUMENT NUMBER: 138:27973
TITLE: Low-temperature anodic bonding facilitated by lithium-exchanged sodium borosilicate glass
AUTHOR(S): Watson, Chad S.; Hirschfeld, Deidre A.; Schubert, W. Kent
CORPORATE SOURCE: New Mexico Institute of Mining and Technology, Socorro, NM, 87801, USA
SOURCE: Ceramic Engineering and Science Proceedings (2002), 23(4), 877-884
CODEN: CESPDK; ISSN: 0196-6219
PUBLISHER: American Ceramic Society
DOCUMENT TYPE: Journal
LANGUAGE: English
AB A critical issue during the hermetic packaging of microelectro-mech. system (MEMS) devices was the need for lower glass-to-silicon bonding temps. Ion exchange, a technique traditionally used to modify the mech. and optical properties of glasses, was employed to reduce the temperature typically required to anodically bond glass to silicon. Lithium ion exchange techniques were used to lower the anodic bonding temperature to as low as 230° using a point-cathode configuration and to 200° using a com. bonder.
REFERENCE COUNT: 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 21 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2002:766978 CAPLUS
DOCUMENT NUMBER: 138:63551
TITLE: Performance and reliability of a MEMS-based tunable optical filter operating in the 1565 nm-1525 nm wavelength range
AUTHOR(S): Sriram, T. S.; Strauss, B.; Pappas, S.; Baliga, A.; Jean, A.; Parodos, T.; Dietz, D.; Wang, P.; Azimi, M.; McCallion, K.; Vakhshoori, D.
CORPORATE SOURCE: Boston Optical Components, Nortel Networks, Wilmington, MA, 01887, USA
SOURCE: Materials Research Society Symposium Proceedings (2002), 722(Materials and Devices for Optoelectronics and Microphotonics), 149-154
CODEN: MRSPDH; ISSN: 0272-9172
PUBLISHER: Materials Research Society
DOCUMENT TYPE: Journal
LANGUAGE: English
AB This paper describes the results of extensive performance and reliability characterization of a Si-based surface micro-machined tunable optical filter. The device comprises a high-finesse Fabry-Perot etalon with one flat and one curved dielec. mirror. The curved mirror is mounted on an electrostatically actuated Si nitride membrane tethered to the substrate using Si nitride posts. A voltage applied to the membrane allows the device to be tuned by adjusting the length of the cavity. The device is coupled optically to an input and an output single mode fiber inside a hermetic package. Extensive performance characterization (over operating temperature range) was performed on the packaged device. Parameters characterized included tuning characteristics, insertion loss, filter line-width and side mode suppression ratio. Reliability testing was performed by subjecting the MEMS structure to a very large number of actuations at an elevated temperature both inside the package and on a test board. The MEMS structure is extremely robust, running trillions of actuations without failures. Package level reliability testing conforming to Telcordia stds. indicated that key device parameters including insertion loss, filter line-width and tuning characteristics did not change measurably over the duration of the test.
REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 22 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN

ACCESSION NUMBER: 2002:599014 CAPLUS

DOCUMENT NUMBER: 138:31697

TITLE: A high reliability, reworkable, fluorinated poly(phenylene ether ketone) (12F-PEK) coating for MOEMS and optical systems packaging

AUTHOR(S): Pike, R. T.; Adkins, C. L.; Newton, C. M.; Bryant, C. E.

CORPORATE SOURCE: Microsystems Technology Group, Harris Corporation, Palm Bay, FL, 32902, USA

SOURCE: Proceedings - International Advanced Packaging Materials Symposium, 8th, Stone Mountain, GA, United States, Mar. 3-6, 2002 (2002), 326-330. Institute of Electrical and Electronics Engineers: New York, N. Y.
CODEN: 69CYRY; ISBN: 0-7803-7434-7

DOCUMENT TYPE: Conference

LANGUAGE: English

AB A fluorinated poly(phenylene ether ketone) encapsulant was identified as a high-performance chemical reworkable thermoplastic with near hermetic protection. The 12F-PEK has legacy as a high-reliability microelectronics coating for bare Si and GaAs die and microelectronics packages including PEM, CSP, PCB, COB, SCM, MCM, and MEMS. It has recently been discovered that the 12F-PEK coating is a peripheral packaging candidate for MOEMS, electrooptical, and micro-scale optical applications. Characterization of the 12F-PEK encapsulant revealed a refractive index of 1.51 from 200-900 nm, <5% haze from 350-800 nm, >90% transmission from 1000-2100 nm, 0.07% moisture absorption, and no failures at 85°/85% RH/5V bias/2500 h with Sandia ATC 2.6 TVs. The low water absorption and long-term stability of the 12F-PEK fluoropolymer presents a novel approach for packaging optical systems that will be subjected to hostile environmental conditions.

REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 23 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN

ACCESSION NUMBER: 2002:465131 CAPLUS

TITLE: Enclosure for mems apparatus and method of using the same

INVENTOR(S): Daneman, Michael J.; Behin, Behrang; Wall, Franklin

PATENT ASSIGNEE(S): Onix Microsystems, Inc, USA

SOURCE: U.S. Pat. Appl. Publ.
CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 6

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
US 20020075551 <--	A1	20020620	US 2001-989905		20011120
WO 2001077007 <--	A1	20011018	WO 2001-US11046		20010404
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW					
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG					
WO 2002091464 <--	A1	20021114	WO 2002-US9038		20020301
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW					
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG					
AU 2002252486 <--	A1	20021118	AU 2002-252486		20020301
US 7183633	B2	20070227	US 2004-469516		20040527
PRIORITY APPLN. INFO.:			US 2000-250237P	P	20001129
			WO 2001-US11046	W	20010404
			WO 2001-US11047	W	20010404
			US 1999-123496P	P	19990309
			WO 2000-US5744	A	20000302
			US 2000-546432	A	20000410
			US 2001-798129	A	20010301
			US 2001-851587	A	20010508
			US 2001-853868	A	20010511

L2 ANSWER 23 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN (Continued)

US 2001-853869	A	20010511
US 2001-853870	A	20010511
US 2001-891760	A	20010625
US 2001-303755P	P	20010707
US 2001-900841	A	20010707
US 2001-949210	A	20010907
US 2001-992530	A	20011106
US 2001-992531	A	20011106
US 2001-989905	A	20011120
WO 2002-US9038	W	20020301

AB An enclosure for sealing a MEMS optical device, a MEMS apparatus, a MEMS module, and a method for switching optical signals are disclosed. The enclosure includes one or more sidewalls and an optical element hermetically sealed to at least one of the sidewalls. Suitable optical elements include windows, lenses and lens arrays. The enclosure may be evacuated to improve the performance of the MEMS device enclosed within it. The MEMS apparatus includes a MEMS device enclosed by an enclosure of the type described above. The MEMS device may include a substrate and the enclosure may be bonded to the substrate. Alternatively, the MEMS device may include a substrate attached to a mount and the enclosure may be bonded to the mount. The MEMS module includes a mount and a MEMS device attached to the mount. One or more optical fibers are attached to the mount proximate the MEMS device. An enclosure, attached to the mount encloses the MEMS device. The fibers are located outside the enclosure. Optical signals may be coupled between the fibers and the MEMS device within the enclosure through an optical elements in the sidewall. The optical switching method proceeds by reducing a pressure of an atmosphere proximate the MEMS optical device and moving at least one of the optical elements from a first position to a second position. The optical element deflects an optical signal when it is in the second position.

L2 ANSWER 24 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN

ACCESSION NUMBER: 2002:453290 CAPLUS

DOCUMENT NUMBER: 137:39633

TITLE: High aspect ratio through-hole interconnections in silicon substrates

AUTHOR(S): Suemasu, T.; Itoi, K.; Yamamoto, S.; Takizawa, T.

CORPORATE SOURCE: Electron. Device Res. Lab., Fujikura Ltd., Japan

SOURCE: Fujikura Giho (2002), 102, 53-57
CODEN: FUGIEH; ISSN: 0912-2761

PUBLISHER: Fujikura

DOCUMENT TYPE: Journal; General Review

LANGUAGE: Japanese

AB A review. We have developed key technologies to form conductive interconnections through a thick Si substrate, which are potentially applied for 3-dimensional stacking of semiconductor devices or packaging of Micro Optical Electro-Mech. System (MOEMS) devices.
We demonstrate to form metal filled Through-Holes (THs) in thick Si (Si) substrates (t = .apprx.500 μm) mainly using Photo Assisted Electro-Chemical Etching (PAECE) and Molten Metal Suctioned Method (MMSM).
The THs had 15 μm in the diameter and the aspect ratio of 35. And the maximum d. was 500 THs/cm2. The dielec. breakdown voltage of the THs was >500 V. In result of a radioisotope leak test using Kr-85, the leakage rate of THs between the front and the back of the substrate was lower than the limit of detection (1 + 10-15 Pa.m3/s).

L2 ANSWER 25 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2002:376067 CAPLUS
DOCUMENT NUMBER: 137:86315
TITLE: Getters: micromolecular scavengers for packaging
AUTHOR(S): Previti, Mike; Gilleo, Ken
CORPORATE SOURCE: Cookson Semiconductor Packaging Materials, Foxborough, MA, USA
SOURCE: Proceedings - International Symposium on Advanced Packaging Materials: Processes, Properties and Interfaces, Braselton, GA, United States, Mar. 11-14, 2001 (2001), Meeting Date 2001, 201-206. Institute of Electrical and Electronics Engineers: New York, N. Y.
CODEN: 69CPT9; ISBN: 0-930815-64-5
DOCUMENT TYPE: Conference; General Review
LANGUAGE: English
AB A review on the use of various types of getters for microoptoelectromech. (MOEMS) devices. Dual-purpose moisture particle getters are ideal and are already used in some optical microelectromech. (MEMS) com. products. However, more work needs to be done in this area, especially for quasi-hermetic packaging.
REFERENCE COUNT: 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 26 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2001:864735 CAPLUS
DOCUMENT NUMBER: 135:379905
TITLE: Packaging micromechanical devices in all-silicon chamber
INVENTOR(S): Degani, Yinon; Dudderar, Thomas Dixon; Tai, King Lien
PATENT ASSIGNEE(S): Lucent Technologies Inc., USA
SOURCE: Eur. Pat. Appl., 8 pp.
CODEN: EPXXDW
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1157967	A2	20011128	EP 2001-304276	20010514 <--
EP 1157967	A3	20030102		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
CA 2342409	A1	20011122	CA 2001-2342409	20010329 <--
TW 536523	B	20030611	TW 2001-90111671	20010516 <--
JP 2002043449	A	20020208	JP 2001-151776	20010522 <--
JP 3424926	B2	20030707		
PRIORITY APPLN. INFO.:			US 2000-575883 A	20000522

AB The specification describes packaging assemblies for micro-electronic machined mech. systems (MEMS). The MEMS devices in these package assemblies are based on Si MEMS devices on a Si support and the MEMS devices and the Si support are mech. isolated from foreign materials. Foreign materials pose the potential for differential thermal expansion that deleteriously affects optical alignment in the MEMS devices. In a preferred embodiment the MEMS devices are enclosed in an all-Si chamber. Mech. isolation is also aided by using a pin contact array for interconnecting the Si support substrate for the MEMS devices to the next interconnect level. The use of the pin contact array also allows the MEMS devices to be easily demountable for replacement or repair.
REFERENCE COUNT: 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 27 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2001:728570 CAPLUS
DOCUMENT NUMBER: 136:28303
TITLE: Stress analysis of silicon membranes with electroplated permalloy films using Raman scattering
AUTHOR(S): Cho, Hyoung J.; Oh, Kwang W.; Ahn, Chong H.; Boolchand, P.; Nam, Tae-Chul
CORPORATE SOURCE: Department of Electrical and Computer Engineering and Computer Science, University of Cincinnati, Cincinnati, OH, 45221-0030, USA
SOURCE: IEEE Transactions on Magnetics (2001), 37(4, Pt. 1), 2749-2751
CODEN: IEMGAQ; ISSN: 0018-9464
PUBLISHER: Institute of Electrical and Electronics Engineers
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The authors have measured the stress profile on a Si membrane electroplated with a permalloy film using Raman scattering. The effect of Si membrane thickness and permalloy film thickness on stress distribution was studied. Depending upon the nature of stress, the optic phonon in Si at 520 cm-1 either shifts upward (compressive) or downward (tensile). The phonon frequency shift is proportional to the magnitude of stress. A microscope X-Y stage was used to map the stress distribution over the Si membrane that was covered and uncovered by the permalloy film.
Si membranes in the thickness range, 9 µm < tm < 12 µm, and permalloy films in the thickness range, 6 µm < tp < 13 µm showed evidence of compressive stress. Based on the present results, membrane type microvalve design is optimized to prevent leakage, originating from stressed membranes. Such a nondestructive and noncontact microscopic stress anal. technique can be applied for design optimization in various magnetic MEMS devices.
REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 28 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 2001:722439 CAPLUS
DOCUMENT NUMBER: 135:380013
TITLE: Thermal evolution of the magnetization in nanocrystalline Fe particles investigated by electron holography
AUTHOR(S): Bonetti, E.; Del Bianco, L.; Pasquini, L.; Matteucci, G.; Beeli, C.; Signoretti, S.
CORPORATE SOURCE: Department of Physics, University of Bologna and National Institute for the Physics of Matter (INFM), Bologna, I-40127, Italy
SOURCE: Journal of Applied Physics (2001), 90(8), 4152-4158
CODEN: JAPIAU; ISSN: 0021-8979
PUBLISHER: American Institute of Physics
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Micrometric, irregularly shaped Fe particles with a nanocryst. structure have been prepared by mech. attrition through ball-milling. Electron holog. has been employed to visualize the stray field emerging from isolated Fe particles, both at 300 K and at selected temps. T ≤ 1200 K, from which indirect information on the magnetic domain configuration has been inferred. By complementary x-ray diffraction and TEM studies a relation has been established between the changes of the leakage field and of the microstructure upon annealing: the structural evolution is accompanied by strong modifications in the interior magnetization pattern. This relation finds explanation in the framework of the random anisotropy model, including temperature-induced reversible variations in the exchange correlation length and saturation magnetization. Also, the role played by the overall geometrical features of the particles in the determination of the actual domain configuration has been studied.
REFERENCE COUNT: 23 THERE ARE 23 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 29 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 1998:190952 CAPLUS
DOCUMENT NUMBER: 128:263670
ORIGINAL REFERENCE NO.: 128:52069a,52072a
TITLE: Low temperature packaging of CMOS infrared microsystems by Si-Al-Au bonding
AUTHOR(S): Waelti, M.; Schneeberger, N.; Paul, O.; Baltes, H.
CORPORATE SOURCE: Physical Electronics Laboratory, ETH Zurich, Zurich, CH-8093, Switz.
SOURCE: Proceedings - Electrochemical Society (1998), 97-36(Semiconductor Wafer Bonding: Science, Technology, and Applications), 147-154
CODEN: PESODO; ISSN: 0161-6374
PUBLISHER: Electrochemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB A new low temperature packaging method for MEMS is reported. It is demonstrated with the encapsulation of a CMOS IR detector microsystem. An IR filter is directly attached to the sensor die using an on-chip Au spacer frame electroplated by standard bumping technol. Delicate components such as circuitry and IR pixels are hermetically sealed off and effectively screened from undesired influences. The process is based on the diffusion bonding of the Si filter onto the Au spacer using 1 μm of sputtered Al. Annealing at 350° for 33 min under a bonding pressure of 45 MPa produces bonds with a shear strength larger than 70 MPa. The bonding zone consists of an Au_4Al intermetallic layer. Thermal aging at 155° for 1000 h shows no changes in the interface metallurgy. The method is generally suited for integrated microsystems requiring hermetic packaging.

REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 30 OF 30 CAPLUS COPYRIGHT 2009 ACS on STN
ACCESSION NUMBER: 1995:952034 CAPLUS
TITLE: Packaging of microfabricated devices and systems
AUTHOR(S): Ko, Wen H.
CORPORATE SOURCE: Department of Electrical Engineering and Applied Physics, and Electronics Design Center, Case Western Reserve University, Cleveland, OH, 44106, USA
SOURCE: Materials Chemistry and Physics (1995), 42(3), 169-175
CODEN: MCHPDR; ISSN: 0254-0584
PUBLISHER: Elsevier
DOCUMENT TYPE: Journal
LANGUAGE: English

AB All devices and systems need to be packaged for applications. For microfabricated devices or systems the packaging is an essential part of the design, not an after-thought. The functions of packaging are: (i) to protect the devices from the environment, and (ii) to protect the environment from the device operation. At present, there is no generally applicable packaging method for all microdevices, but there are basic principles useful in packaging design. This article outlines the fundamental requirements, design considerations, and packaging techniques for sensors and microsystems, with selected examples, and suggested refs. The protection of the device includes: (i) elec. isolation and passivation of leads and device structures from the penetration of moisture and ions; sealing techniques and hermeticity measurements are important aspects; (ii) mech. protection to ensure structural integrity and dimensional stability; (iii) thermal and optical isolation, and (i.v.) chemical and biol. isolation and protection. It is also necessary to protect the environment from the device materials and device operation, so that no undesirable reaction with or contamination of the environment occurs. This is especially important for devices used in biomedical, pharmaceutical and food processing. Biocompatibility and contamination must be considered as factors in the design. Successful packaging design requires the integration of knowledge of materials, device characteristics, packaging and evaluation techniques. It remains as a challenge in the MEMS field for engineers.

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=> s (hermetic? or leak?) and (semiconductor or electronic) and (optic? or visual?)
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        125618 LEAK?
        690366 SEMICONDUCTOR
        104164 SEMICONDUCTORS
        718231 SEMICONDUCTOR
                 (SEMICONDUCTOR OR SEMICONDUCTORS)
        596113 ELECTRONIC
         39968 ELECTRONICS
        621902 ELECTRONIC
                 (ELECTRONIC OR ELECTRONICS)
       1222552 OPTIC?
        152386 VISUAL?
      25140108 PY<=2004
L3        1117 (HERMETIC? OR LEAK?) AND (SEMICONDUCTOR OR ELECTRONIC) AND (OPTI
               C? OR VISUAL?) AND PY<=2004

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       1635367 SENS?
L4         261 L3 AND (INDICAT? OR SENS?)

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L4    261 ANSWERS   CAPLUS  COPYRIGHT 2009 ACS on STN
CC    76-0 (Electric Phenomena)
      Section cross-reference(s): 57, 73
TI    A new approach for opto-electronic/MEMS packaging
ST    review optoelectronic IC packaging ceramic; MEMS packaging ceramic review
IT    Micromachines
         (microelectromech. devices; new approach for opto-electronic
         /MEMS packaging)
IT    Ceramics
        Electronic packaging materials
        Electronic packaging process
      Optoelectronic semiconductor devices
         (new approach for opto-electronic/MEMS packaging)
IT    Integrated circuits
         (optoelectronic; new approach for opto-electronic/MEMS
         packaging)

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        573560 GASES
       1956527 GAS
                 (GAS OR GASES)
        503698 FLUID
        207273 FLUIDS
        605029 FLUID
                 (FLUID OR FLUIDS)
L5          40 L4 AND (GAS OR FLUID)

=> d 15 1-40 ibib abs)
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FBIB -------- AN, BIB, plus Patent FAM
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IPC --------- International Patent Classifications
MAX --------- ALL, plus Patent FAM, RE
PATS -------- PI, SO
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HITIND ------ IC, ICA, ICI, NCL, CC and index field (ST and IT)
              containing hit terms
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HITSTR ------ HIT RN, its text modification, its CA index name, and
              its structure diagram
HITSEQ ------ HIT RN, its text modification, its CA index name, its
              structure diagram, plus NTE and SEQ fields
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FHITSTR ----- First HIT RN, its text modification, its CA index name, and
              its structure diagram
FHITSEQ ----- First HIT RN, its text modification, its CA index name, its
              structure diagram, plus NTE and SEQ fields
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ALL --------- BIB, AB, IND, RE
APPS -------- AI, PRAI
BIB --------- AN, plus Bibliographic Data and PI table (default)
CAN --------- List of CA abstract numbers without answer numbers
CBIB -------- AN, plus Compressed Bibliographic Data
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DALL -------- ALL, delimited (end of each field identified)
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FAM --------- AN, PI and PRAI in table, plus Patent Family data
FBIB -------- AN, BIB, plus Patent FAM
IND --------- Indexing data
IPC --------- International Patent Classifications
MAX --------- ALL, plus Patent FAM, RE
PATS -------- PI, SO
SAM --------- CC, SX, TI, ST, IT
SCAN -------- CC, SX, TI, ST, IT (random display, no answer numbers;
              SCAN must be entered on the same line as the DISPLAY,
              e.g., D SCAN or DISPLAY SCAN)
STD --------- BIB, CLASS

IABS -------- ABS, indented with text labels
IALL -------- ALL, indented with text labels
IBIB -------- BIB, indented with text labels
IMAX -------- MAX, indented with text labels
ISTD -------- STD, indented with text labels

OBIB -------- AN, plus Bibliographic Data (original)
OIBIB ------- OBIB, indented with text labels

SBIB -------- BIB, no citations
SIBIB ------- IBIB, no citations

HIT --------- Fields containing hit terms
HITIND ------ IC, ICA, ICI, NCL, CC and index field (ST and IT)
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               containing hit terms
HITRN ------- HIT RN and its text modification
HITSTR ------ HIT RN, its text modification, its CA index name, and
              its structure diagram
HITSEQ ------ HIT RN, its text modification, its CA index name, its
              structure diagram, plus NTE and SEQ fields
FHITSTR ----- First HIT RN, its text modification, its CA index name, and
              its structure diagram
FHITSEQ ----- First HIT RN, its text modification, its CA index name, its
              structure diagram, plus NTE and SEQ fields
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OCC --------- Number of occurrence of hit term and field in which it occurs

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an arrow prompt (=>).  Examples of formats include: TI; TI,AU; BIB,ST;
TI,IND; TI,SO.  You may specify the format fields in any order and the
information will be displayed in the same order as the format
specification.

All of the formats (except for SAM, SCAN, HIT, HITIND, HITRN, HITSTR,
FHITSTR, HITSEQ, FHITSEQ, KWIC, and OCC) may be used with DISPLAY ACC
to view a specified Accession Number.
ENTER DISPLAY FORMAT (BIB):
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